



## 5.4.8 Infestation and Invasive Species

This section provides a profile and vulnerability assessment for the infestation and invasive species hazard.

### Hazard Profile

This section provides profile information including description, location and extent, previous occurrences and losses and the probability of future occurrences.

### Description

#### Infestation

An infestation is defined as a state of being invaded or overrun by parasites that attack plants, animals and humans. Insect, fungi and parasitic infestations can result in destruction of various natural habitats and cropland, impact human health, and cause disease and death among native plant, wildlife and livestock. An infestation is the presence of a large number of pest organisms in an area or field, on the surface of a host, or in soil. They result from when an area is inhabited or overrun by these pest organisms, in numbers or quantities large enough to be harmful, threatening or obnoxious to native plants, animals and humans. Pests are any organism (insects, mammals, birds, parasite/pathogen, fungi, non-native species) that are a threat to other living species in its surrounding environment. Pests compete for natural resources or they can transmit diseases to humans, crops and livestock. Human populations are generally impacted by insect or animal infestations that can result in health impacts and can lead to potential epidemics or endemics.

New York State has been impacted by various past and present infestations including: high population of mosquitoes (West Nile Virus); deer ticks (Lyme disease); Asian longhorned beetles; and hemlock woolly adelgid. Other infestations that have impacted the State include: Eastern Equine Encephalitis, La Crosse Encephalitis, Powassan Virus, St. Louis Encephalitis, Western Equine Encephalitis, Emerald Ash Borer, and Sirex Woodwasp. Not all of these infestations have occurred in Suffolk County; therefore, the following infestations listed below, will further be discussed in this section.

*West Nile Virus (WNV)* is a mosquito-borne virus that can cause encephalitis (inflammation of the brain) or meningitis (inflammation of the lining of the brain and spinal cord). WNV is spread to humans by the bite of an infected mosquito. A mosquito becomes infected by biting a bird that carries the virus (NYS DOH, 2013).

*Lyme Disease* is caused by the Lyme Disease Bacterium, *Borrelia burgdorferi*, which normally lives in mice, squirrels and other small animals. It is transmitted among these animals and to humans, through the bites of a certain species of ticks, particularly the deer tick. Lyme Disease infections can cause symptoms affecting the skin, nervous system, heart, and/or joints of an individual (NYSDOH, 2013).

#### Invasive Species

Invasive species are non-native species that can cause harm to the environment, the economy, or to human health. They come from all over the world, and as international trade increases, so does the rate of invasive species introductions. Invasive species threaten nearly every aspect of the world and are one of the greatest threats to New York State's biodiversity (NYSDEC, 2014). They have the potential to cause or contribute to the following:

- Habitat degradation and loss



- Loss of native fish, wildlife, and tree species
- Loss of recreational opportunities and income
- Crop damage and diseases in humans and livestock (NYSDEC, 2014)

Thousands of species have been introduced in the U.S., posing serious threats to agriculture, human health, and the integrity of land and water. New York State is vulnerable to damages from these invasive species. The following list contains the names of invasive species found in New York State. This list does not include all plant species that are invasive or potentially invasive in the State. Jurisdictions in Suffolk County are devoting funds to help control the invasive plant species populations, along with adopting codes to regulate and control the planting of different plant species.

- |                              |                            |                             |
|------------------------------|----------------------------|-----------------------------|
| • Amur Cork Tree             | • Floating Primrose Willow | • Parrot-feather            |
| • Amur Honeysuckle           | • Floating Primrose-willow | • Porcelain Berry           |
| • Autumn Olive               | • Garden Loosestrife       | • Purple Loosestrife        |
| • Beach Vitex                | • Garlic Mustard           | • Reed Canary-grass         |
| • Black Locust               | • Giant Hogweed            | • Rock Snot (diatom)        |
| • Black Swallow-wort         | • Japanese Angelica Tree   | • Rusty Willow              |
| • Border Privet              | • Japanese Barberry        | • Slender False Brome       |
| • Brazilian Waterweed        | • Japanese Honeysuckle     | • Small Carpgrass           |
| • Broad-leaf Pepper-grass    | • Japanese Hops            | • Smooth Buckthorn          |
| • Broadleaf Water-milfoil    | • Japanese Knotweed        | • Spotted Knapweed          |
| • Canada Thistle             | • Japanese Stilt Grass     | • Sycamore Maple            |
| • Carolina Fanwort           | • Japanese Virgin's-bower  | • Tall Glyceria             |
| • Chinese Lespedeza          | • Kudzu                    | • Uruguayan Primrose-willow |
| • Chinese Sliver Grass       | • Leafy Spurge             | • Water Chestnut            |
| • Chinese Yam                | • Lesser Celandine         | • Water thyme               |
| • Cogon Grass                | • Marsh Dewflower          | • Wavyleaf Basketgrass      |
| • Common Buckthorn           | • Mile-a-minute Weed       | • Wild Chervil              |
| • Common Frogbit             | • Morrow's Honeysuckle     | • Wineberry                 |
| • Cup-plant                  | • Mugwort                  | • Winged Euonymus           |
| • Curly Pondweed             | • Multiflora Rose          | • Winter Creeper            |
| • Cut-leaf Teasel            | • Narrowleaf Bittercress   | • Yellow Floating Heart     |
| • Cypress Spurge             | • Norway Maple             | • Yellow Iris               |
| • Eurasian Water-milfoil     | • Oriental Bittersweet     |                             |
| • European Common Reed Grass | • Pale Swallow-wort        |                             |

In Suffolk County, the more common invasive plant species include: garlic mustard, Japanese barberry, Japanese knotweed, Japanese bamboo, purple loosestrife, common reed, common reed grass, common buckthorn, and water chestnut. The following list identifies those established invasive species in Suffolk County. Those species in **bold** indicate that they have over five infestations.

- |                             |                       |                                 |
|-----------------------------|-----------------------|---------------------------------|
| • Amur cork tree            | • Border privet       | • Cheat grass                   |
| • <b>Amur honeysuckle</b>   | • Bouncing-bet        | • Chinese and Japanese wisteria |
| • Amur maple                | • Bradford pear       | • Chinese lespedeza             |
| • Bird's Foot Trefoil       | • Brazilian waterweed | • Chocolate vine                |
| • Black knapweed            | • Bulbous bluegrass   | • Coltsfoot                     |
| • <b>Black locust</b>       | • Canada Bluegrass    | • <b>Common buckthorn</b>       |
| • <b>Black swallow-wort</b> | • Canada thistle      |                                 |



- Cow vetch
- Creeping bentgrass
- Creeping buttercup
- Creeping smartweed
- Crown vetch
- Curly pondweed
- Cypress spurge
- Dame's rocket
- Day lily
- English ivy
- **Eurasian water-milfoil**
- European (Black) alder
- European bird cherry
- European cranberry bush
- European privet
- European reed grass
- European spindletree
- Evergreen blackberry
- Fanwort
- **Floating primrose willow**
- **Frogbit**
- **Garlic mustard**
- Goutweed
- **Gray florist's willow**
- Hair fescue
- Hairy willow herb
- Japanese (Rugosa) rose
- **Japanese angelica tree**
- **Japanese barberry**
- Japanese black pine
- Japanese holly
- **Japanese honeysuckle**
- Japanese hops
- **Japanese knotweed**
- Japanese maple
- **Japanese stilt grass**
- Japanese virgin's bower
- Jetbead
- Jimsonweed
- Kentucky bluegrass
- **Kudzu**
- **Lesser celandine**
- Linden arrowwood
- Mexican summer-cypress
- **Mile-a-minute vine**
- **Morrow's honeysuckle**
- Mugwort
- **Multiflora rose**
- Narrowleaf bittercress
- **Norway maple**
- Orange-eye butterfly-bush
- **Oriental bittersweet**
- Oriental photinia
- Parrot-feather
- Periwinkle
- Porcelain berry
- Princess tree
- Puncture vine
- Purple foxglove
- Redtop
- Reed canary grass
- Sheep sorrel
- Siberian elm
- Siebold viburnum
- Silk tree
- Slender cottonweed
- Smooth buckthorn
- Speedwell
- Spotted knapweed
- St. John's wort
- Sweet cherry
- Sycamore maple
- Tall fescue
- Tea viburnum
- Timothy
- Trailing nightshade
- Tree-of-heaven
- **Water thyme**
- Watercress
- Weeping lovegrass
- White mulberry
- White Poplar
- Wild chervil
- **Wineberry**
- **Winged euonymus**
- Winter creeper
- Yellow floating heart
- Yellow hornpoppy
- Yellow iris

The following table provides all animals and pathogens that affect natural areas of Long Island and Suffolk County.

**Table 5.4.8-1. Animals, Insects, and Pathogens Impacted Natural Areas of Long Island**

Name	Species Type
Asian clam*	Mollusk
Asian loach	Fish
Asian long-horned beetle	Insect
Asian shore crab*	Crustacean
Bacterial leaf scorch	Pathogen
Bighead carp	Fish
Black carp	Fish
Brown longhorned spruce beetle	Insect
Brown marmorated stink bug*	Insect



### Section 5.4.8: Risk Assessment – Infestation and Invasive Species

Name	Species Type
Butternut canker	Pathogen
Chinese mitten crab	Crustacean
Chinese softshelled turtle	Reptile
Common pine shoot beetle *	Insect
Dogwood anthracnose*	Pathogen
Dutch elm disease*	Pathogen
Emerald ash borer	Insect
Eurasian nun moth	Insect
European boar	Mammal
European green crab*	Crustacean
European gypsy moth*	Insect
European oak bark beetle	Insect
Granulated ambrosia beetle	Insect
Hemlock wooly adelgid	Insect
Mute swan*	Bird
Northern snakehead fish	Fish
Nutria	Mammal
Phytophthora root rot *	Pathogen
Pine canker	Pathogen
Pine flat bug	Insect
Red-eared slider turtle*	Reptile
Sea squirt	Tunicate
Silver carp	Fish
Sirex woodwasp	Insect
Sudden oak death syndrome	Pathogen
Thousand cankers disease	Pathogen
Viburnum leaf beetle*	Insect
White pine blister rust *	Pathogen

Source: Long Island Invasive Species Management Area, 2014

\* Species that have established populations in Long Island

For this HMP Update, the following non-native species will be discussed in further detail for Suffolk County:

*Asian Longhorned Beetles (ALB)* is an exotic pest, native to parts of Asia, threatening a wide variety of hardwood trees in North America, particularly in New York State, New Jersey and Chicago. The beetle is believed to have arrived in New York City in the 1980s, in wooden packing material used in cargo shipments from China. The ALB has the ability to infest certain hardwood trees, eventually destroying them. They are threat to public, private and commercial hardwood trees. The U.S. Department of Agriculture (USDA) believes this beetle can probably survive and reproduce in most sections of the country where suitable host trees exist.

*Sirex Woodwasp* is a Eurasian native, which was first discovered in New York State in 2005. This was the first North American discovery of this exotic, invasive pest that is one of the top 10 most serious



forest insect pest invaders worldwide. Native woodwasps utilize dead and dying pines, whereas the invasive sirex woodwasp attack healthy pines as well. Pines, with a diameter of six inches or greater, are susceptible; however, stressed, suppressed, and crowded pines are favored by the sirex woodwasp (NYIS, 2013). All pine species are believed to be at risk, particularly stressed Scots (or Scotch), red and eastern white pines (NYSDEC, 2013).

### Regulations

The Invasive Species Council is a statutory body created in 2008 by Title 17, Section 9 of the Environmental Conservation Law (ECL). It was created to coordinate among multiple state entities and partners in addressing the environmental and economic threats of invasive species. The legislation defines invasive species as “a species that is non-native to the ecosystem under consideration and whose introduction causes or is likely causing economic or environmental harm or harm to human health”. The Council is co-led by the NYSDEC and the Department of Agriculture and Markets (NYSDAM) and consists of nine members: the Commissioners of the NYSDEC; NYSDAM; Transportation; Education; the Office of Parks, Recreation and Historic Preservation; the Secretary of State, the Chairperson of the New York State Thruway Authority, the Director of the New York State Canal Corporation, and the Chairperson of the Adirondack Park Agency (NYSDEC, 2014).

The NYSDEC, in cooperation with the Department of Agriculture and Markets, has proposed new invasive species regulations (6 NYCRR Park 575). The proposed regulation includes a list of prohibited species which shall be unlawful to knowingly possess with the intent to sell, import, purchase, transport or introduce; a list of regulated species which shall be legal to possess, sell, purchase, propagate, and transport, but may not be knowingly introduced into a free-living state; and require a permit for education, research, and other approved activities involving prohibited species and release of regulated species into a free-living state. The regulation also specifies the criteria used in making such classifications and a means for future classification of species. The proposed regulation establishes grace periods for certain prohibited species to allow businesses to plan the management of existing stock (NYSDEC, 2014).

In Suffolk County, municipalities have adopted codes to regulate the control and planting of certain plant species. For example, the Town of Babylon adopted a code in 2013 to regulate and control the planting of certain bamboo species.

### Extent and Location

The extent and location of infestations and invasive species depends on the preferred habitat of the species, as well as the species’ ease of movement and establishment. However, each of these threats can impact most areas of New York State, including Suffolk County.

The magnitude of infestations and invasive species ranges from nuisance to widespread. The threat is typically intensified when the ecosystem or host species is already stressed, such as periods of drought. The already weakened state of the ecosystem causes it to more easily be impacted to an infestation. The presence of disease-carrying mosquitoes and ticks and the presence of the *sirex woodwasp* have been reported throughout most of New York State and in Suffolk County as well.

### Infestation

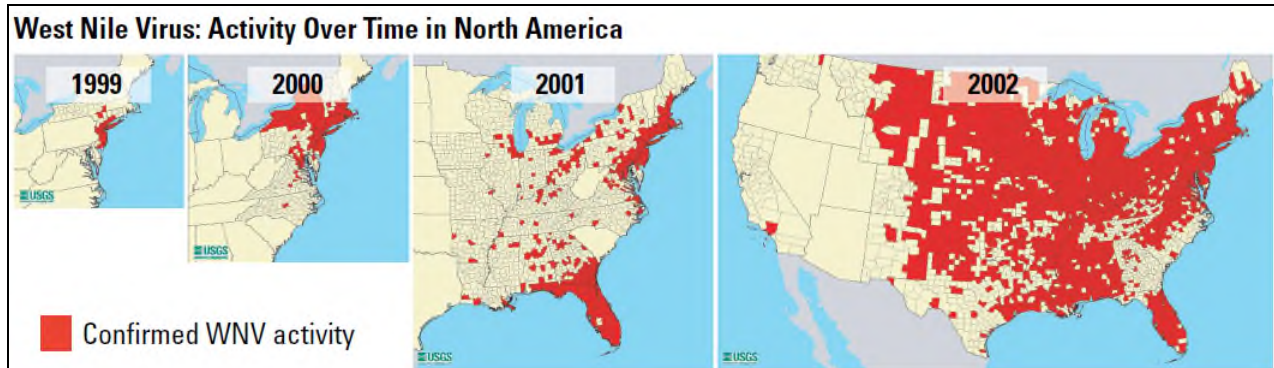
#### *West Nile Virus*

Since it was discovered in the western hemisphere, WNV has spread rapidly across North America, affecting thousands of birds, horses and humans. WNV swept from the New York City region in 1999 to almost all of the continental U.S., seven Canadian provinces and throughout Mexico and parts of the Caribbean by 2004 (USGS, 2003). Figure 5.4.8-1 shows the activity of WNV over time in North America, from 1999 to 2002.





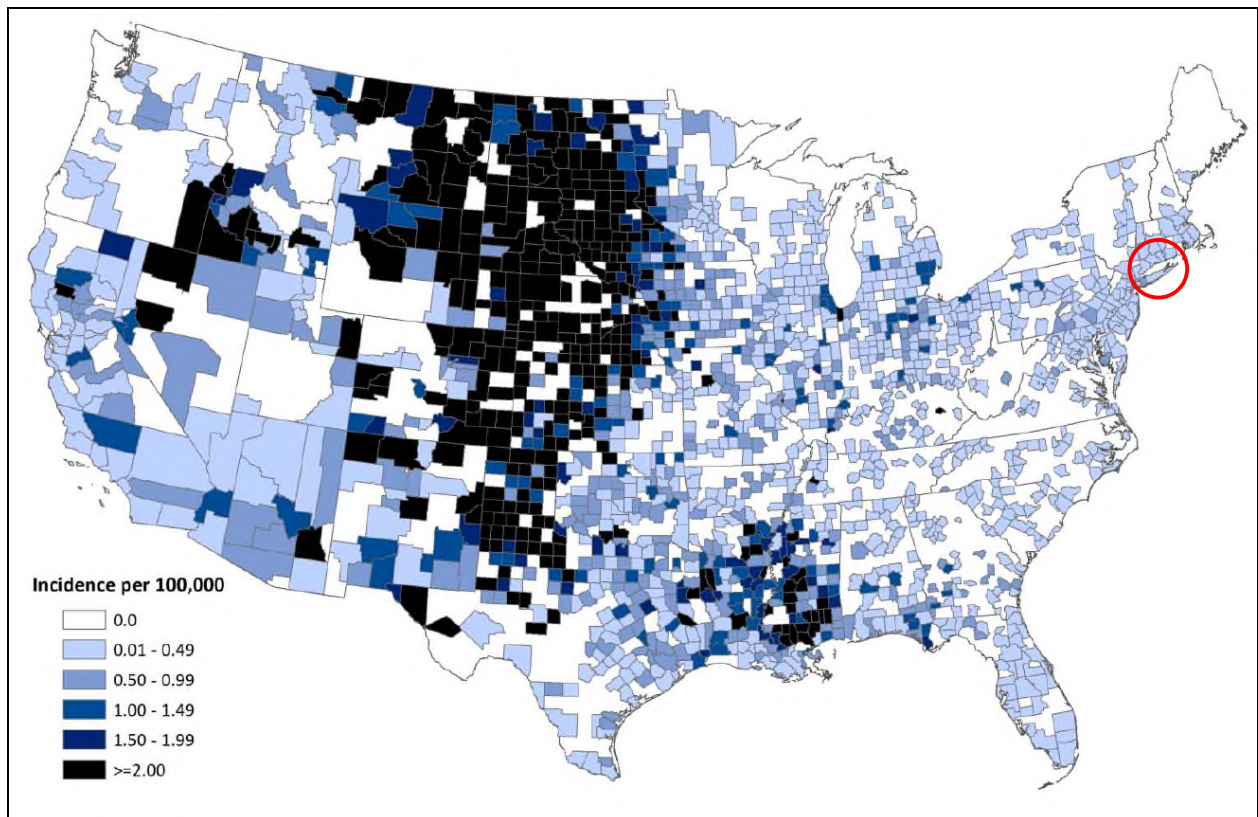
Figure 5.4.8-1. WNV Activity Over Time in North America



Source: USGS, 2003

The CDC has a surveillance program for WNV. Data is collected on a weekly basis and reported for five categories: wild birds, sentinel chicken flocks, human cases, veterinary cases and mosquito surveillance (CDC, 2013). Figure 5.4.8-2 illustrates WNV activity in the U.S. for 1999-2012.

Figure 5.4.8-2. Average Annual Incidence of WNV Reported to CDC, 1999-2012



Source: CDC 2013

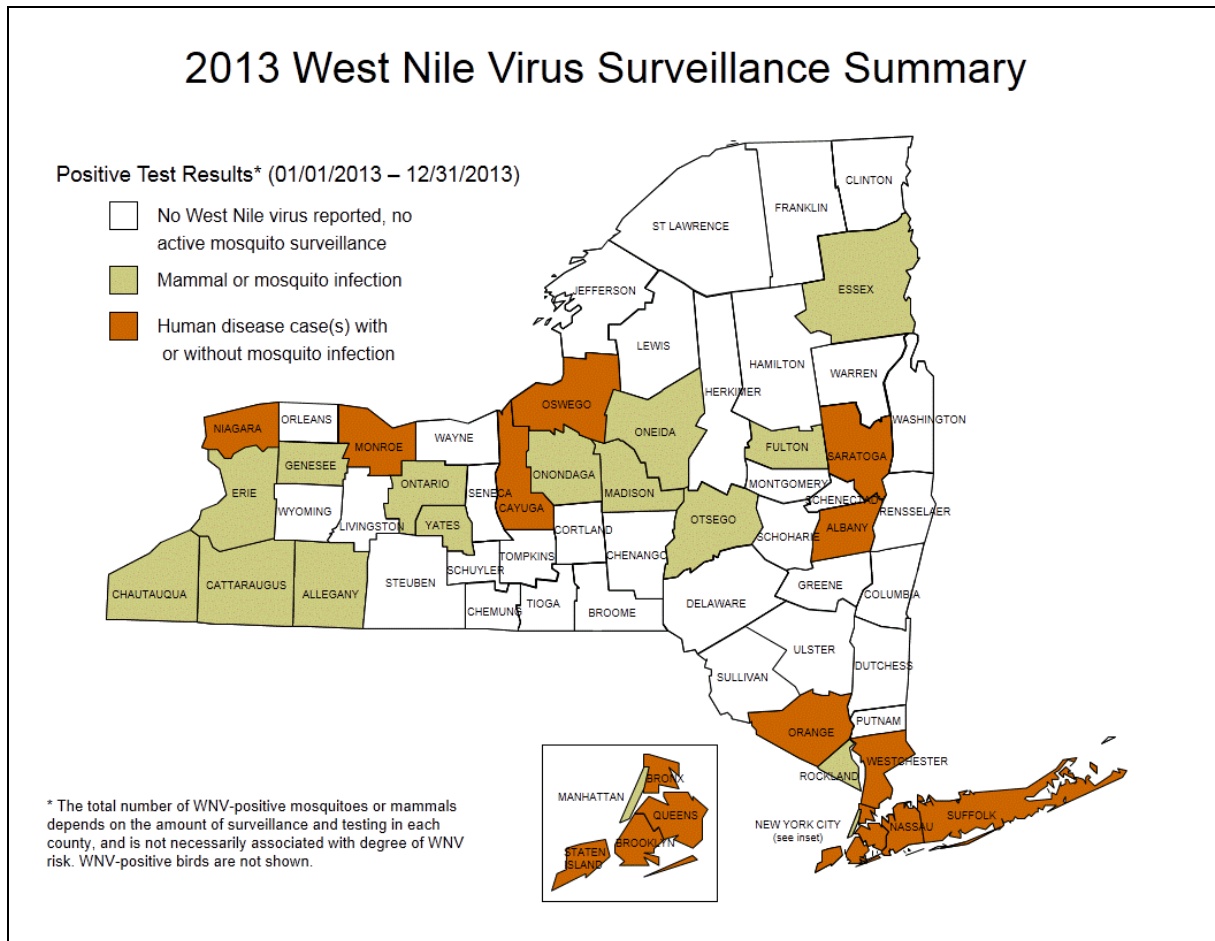
Note: The circle indicates the approximate location of Suffolk County. The figure indicates that Suffolk County averaged 0.01 to 0.49 per 100,000 incidence annually between 1999 and 2012.

WNV has been present in Suffolk County since 2000. Based on information provided by the New York State Department of Health (NYSDOH), all of Suffolk County has experienced WNV cases from 2000 to



present (NYSDOH, 2013). Specific information regarding the location of the cases was not made available. In 2012, there were 210 positive cases of WNV in Suffolk County, with 14 of those cases being human. Figure 5.4.8-3 illustrates the location of positive test results of WNV in New York State for 2013, through October 9. Suffolk County was shown as having human disease cases with or without mosquito infection.

Figure 5.4.8-3. 2013 West Nile Virus Surveillance Summary



Source: NYSDOH, 2013

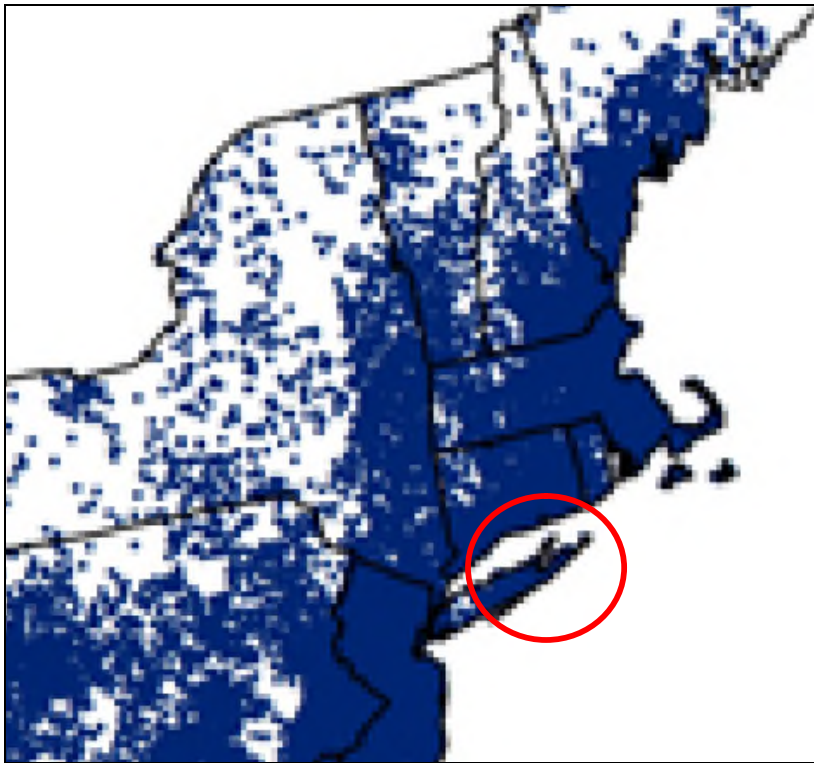
Note: The total number of WNV-positive mosquitoes/mammals depends on the amount of surveillance and testing in each county and is not necessarily associated with degree of WNV risk. This figure does not include WNV-positive birds.

### Lyme Disease

Lyme disease is the most commonly reported vectorborne illness in the U.S. In 2009, it was the fifth most common nationally notifiable disease. In 2010, 94-percent of Lyme disease cases were reported in 12 states – Connecticut, Delaware, Maine, Maryland, Massachusetts, Minnesota, New Jersey, New Hampshire, New York, Pennsylvania, Virginia, and Wisconsin (CDC, 2011). Between 2007 and 2011, there were 1,050 confirmed cases of Lyme disease in Suffolk County (CDC 2013). Figure 5.4.8-4 shows the reported cases of Lyme disease in the northeast U.S. for 2012.



Figure 5.4.8-4. 2012 Reported Cases of Lyme Disease in the Northeast U.S.



Source: CDC 2012

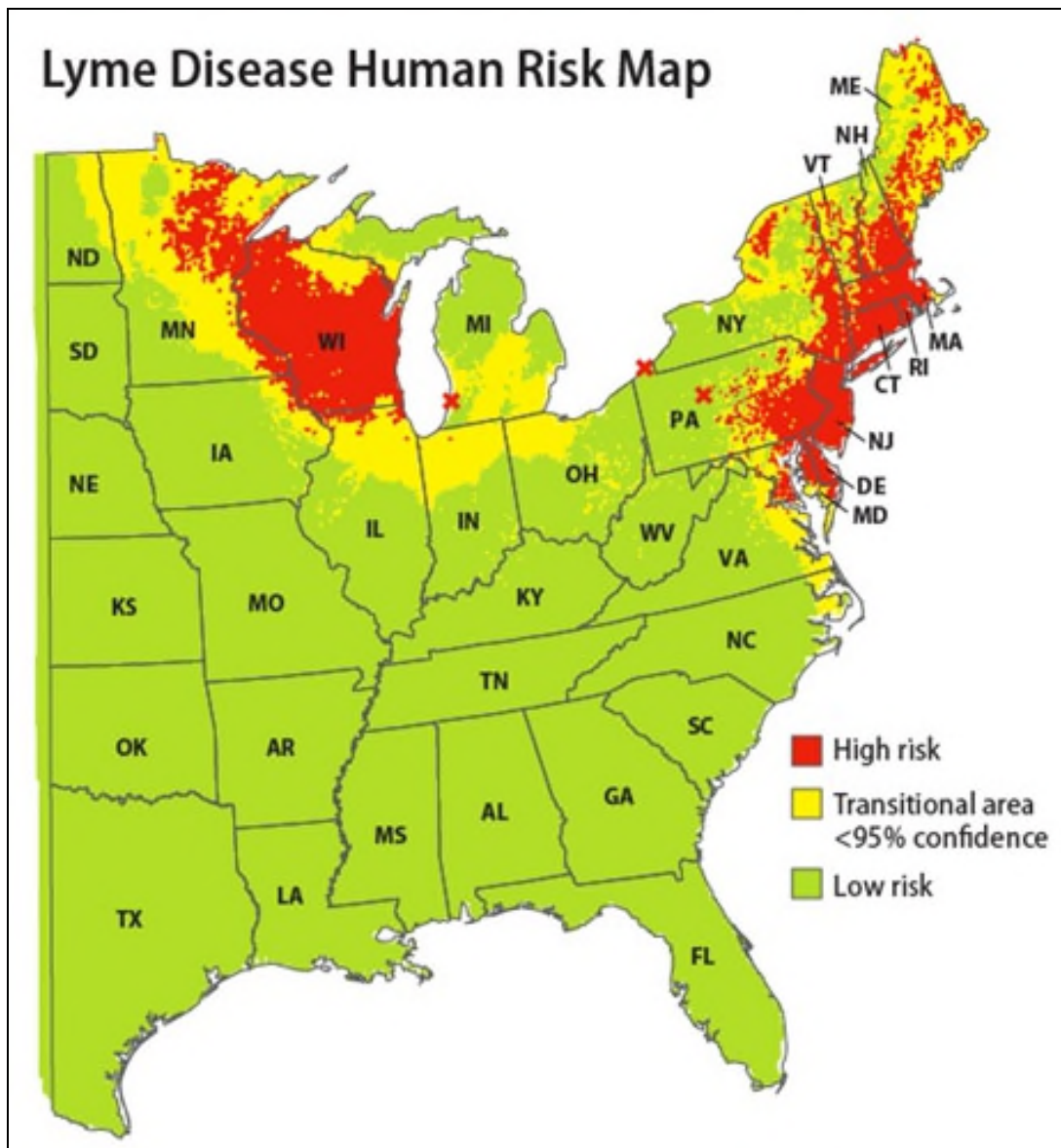
Note: The red circle indicates the approximate location of Suffolk County.

Figure 5.4.8-5 shows the risk of Lyme disease in the northeastern U.S. The figure indicates that Suffolk County is located in a high risk area with transitional areas located along the far eastern border of the County.





Figure 5.4.8-5. Lyme Disease Human Risk Map in the Northeast U.S.



Source: Yale School of Public Health, 2013

Note (1): A majority of Suffolk County is located in a high risk area. The far eastern portions of the County are located in a transitional area.

The CDC Division of Vector Borne Diseases (DVBD) indicated in 2013 that New York State was the state with the second-highest number of confirmed Lyme disease cases from 2003 to 2012, totaling approximately 42,111 cases. Only Pennsylvania had a higher total, with 42,189 (CDC, 2013). As of March 2013, over 95,000 cases have been reported for New York State to the NYSDOH since Lyme disease became reportable in 1986 (NYSDOH, 2013).

This disease has become endemic in Suffolk, Nassau, Westchester, Rockland, Putnam, Orange, Ulster, Dutchess and Albany counties. The deer tick has been found in 42 counties within New York State. The deer tick does not appear to be a resident of New York City, although the American dog tick (*Dermacentor variabilis*), the vector of Rocky Mountain spotted fever, does occur in coastal areas of New York City and is common on Long Island and in downstate counties. In infested areas, the deer tick is



common wherever deer and woodland mice frequent. White-tailed deer thrive where suburban lawns adjoin woodland or open fields. Open areas provide deer grazing areas, woods offer shelter and browse (food), and residential lawns provide ornamental plantings that serve as a food source. People are increasingly establishing their home sites in wooded areas. In so doing, they create a habitat that attracts deer, mice and ticks. On Long Island, ticks are often found in beach grass near seashores in addition to the above-mentioned areas (Cornell Cooperative Extension, 2003).

According to the Suffolk County Community Health Assessment, of particular interest in Suffolk County are the tickborne diseases. Currently Babesiosis, Ehrlichiosis, Lyme disease and Rocky Mountain Spotted Fever are reportable diseases and endemic to Suffolk County (Suffolk County Department of Health Services, 2013).

### **Invasive Species**

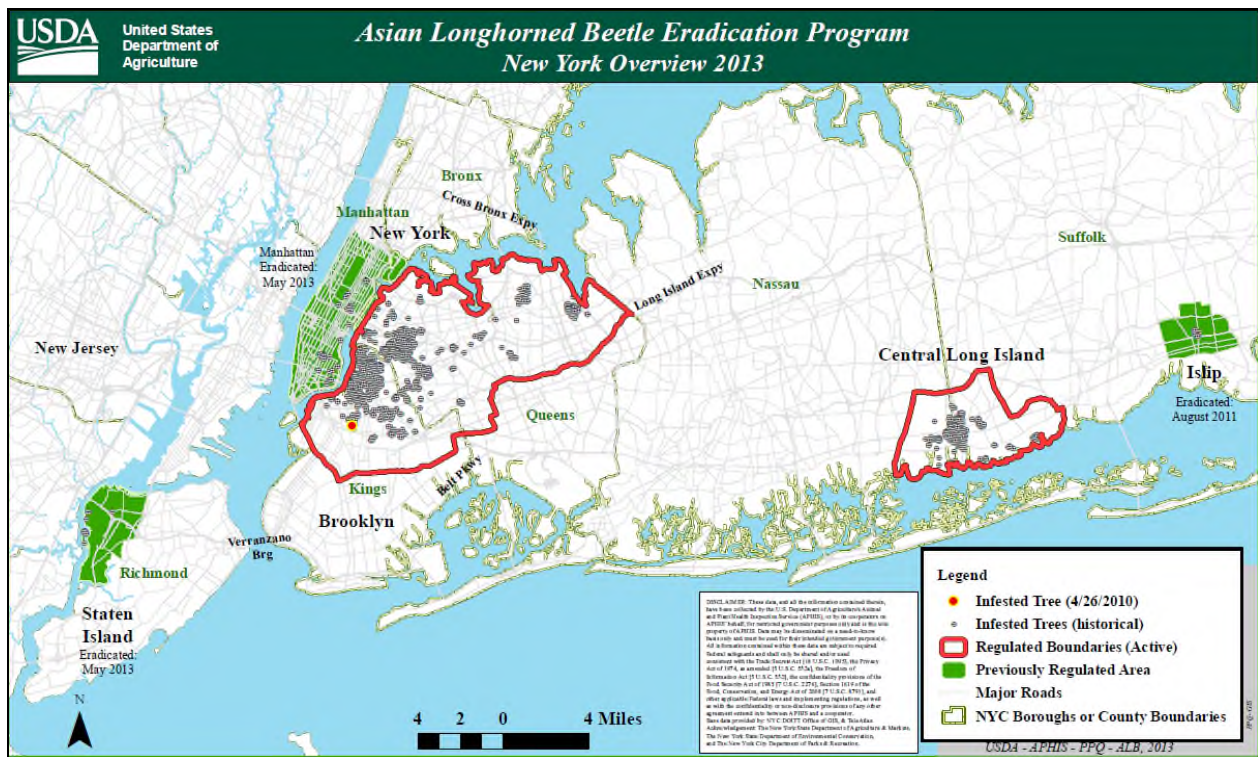
#### *Asian Longhorned Beetles (ALB)*

Although it is believed that this beetle arrived in the U.S. between the 1980's and 1990's, the ALB was first discovered in McCarren Park of Greenpoint, Brooklyn on August 19, 1996 and soon after in Amityville, Long Island in September 1996. Since then, infestations were found in and around New York City, including on Long Island (Bayside, Islip), Manhattan, Queens and Flushing Park. At present, it has been found in several areas in New York City and Long Island, the Chicago area (the quarantine being lifted on July 12, 2006), New Jersey, and Toronto, Canada. Additionally, the USDA's Animal and Plant Health Inspection Service (APHIS) detected ALB in 26 warehouses and residential sites in 14 states. This detection led to actions that prevented the ALB from getting outdoors.

The USDA-APHIS Plant Protection and Quarantine (PPQ) has implemented quarantine and control strategies and restrictions in New York State, Illinois, and New Jersey that seek to eradicate this serious pest from the U.S. Quarantine areas have been established where beetles or their damage have been found, as a legal measure taken by a state or federal agency to prohibit the spread of a pest from one area to another. Code of Federal Regulations (e-CFR), Title 7: Agriculture, PART 301—Domestic Quarantine Notices, have been developed by the USDA-APHIS for handling wood and planting trees in these ALB quarantine zones. The Nature Conservancy has indicated that if ALBs were to break out of the established quarantine areas and spread into upstate New York State and New England, they could cause a devastating economic blow to the sugar maple, tourism, timber, and forest product industries. Over 1.5 billion trees are susceptible across New England (The Nature Conservancy, 2007). Figure 5.4.8-6 shows the 2013 regulated boundaries throughout New York City and Long Island. As shown, the Islip Area was released from regulation in August 2011. Figure 5.4.8-7 shows a detailed map of the central Long Island quarantined areas.



Figure 5.4.8-6. 2013 Regulated Boundaries – New York State

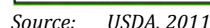


Source: APHIS, 2013





### Figure 5.4.8-7. Long Island ALB Quarantine Areas



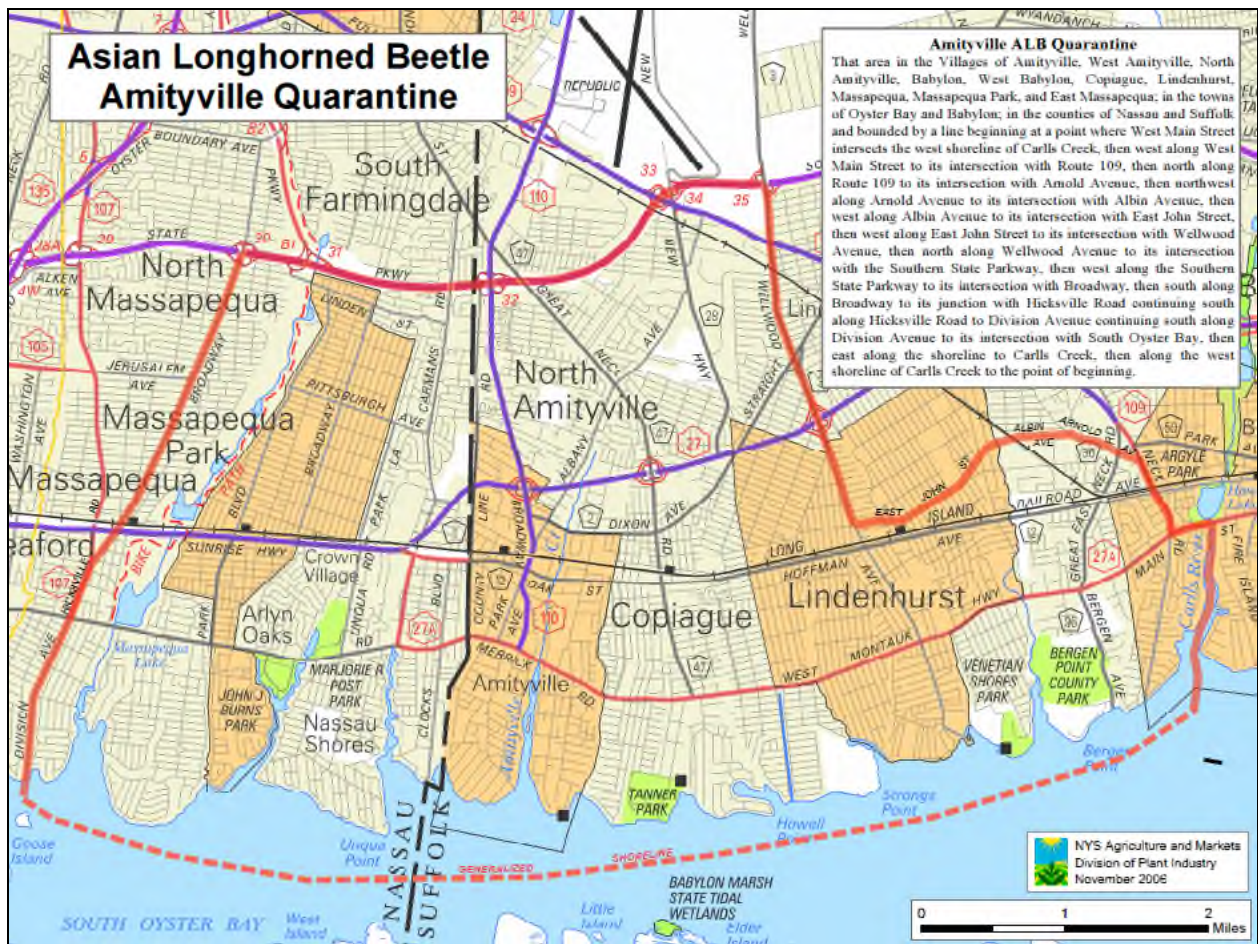
As defined by 7 CFR 301.51-3, the Amityville Quarantine area, which spans both Nassau and Suffolk Counties, is described in Table 5.4.8-2. The 2006 map of this area is shown in Figure 5.4.8-8.

**Table 5.4.8-2. Amityville Quarantine Area within Nassau and Suffolk Counties**

Source: New York State Agriculture and Markets, Division of Plant Industry, 2006



Figure 5.4.8-8. ALB Amityville Quarantine



Source: New York State Agriculture and Markets, Division of Plant Industry, 2006

### *Sirex Woodwasp*

The species is native to Europe, Asia, and North Africa. It can now be found within the northeast U.S. ranging from Michigan to New Hampshire. In New York State, the most affected species are scots pine, Austrian pine, and red pine from plantations dating to the mid-1900s. The damage to the underperforming trees has a minimal economic effect to the state (NYIS, 2013).

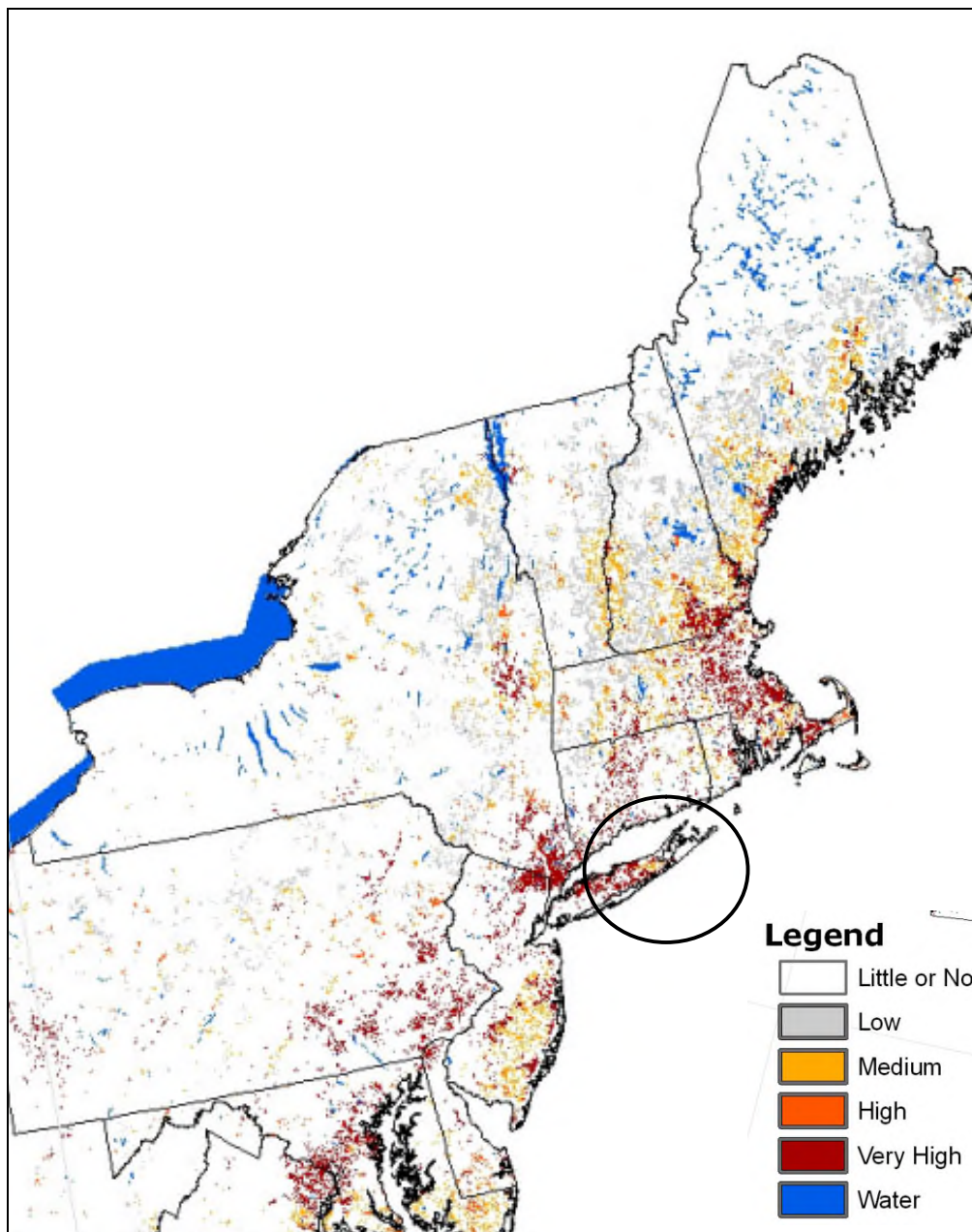
Impacts of the *Sirex* Woodwasp have been relatively minor in New York State, including Suffolk County. The largest damage is being seen in Scots, Austrian, and red pine forests that are crowded, stressed, and underperforming (NYIS, 2013). Little economic or environmental impact is expected in Suffolk County.

Figure 5.4.8-9 displays *Sirex* Woodwasp susceptibility in the northeast U.S.





Figure 5.4.8-9. Sirex Woodwasp Susceptibility in the Northeast U.S.



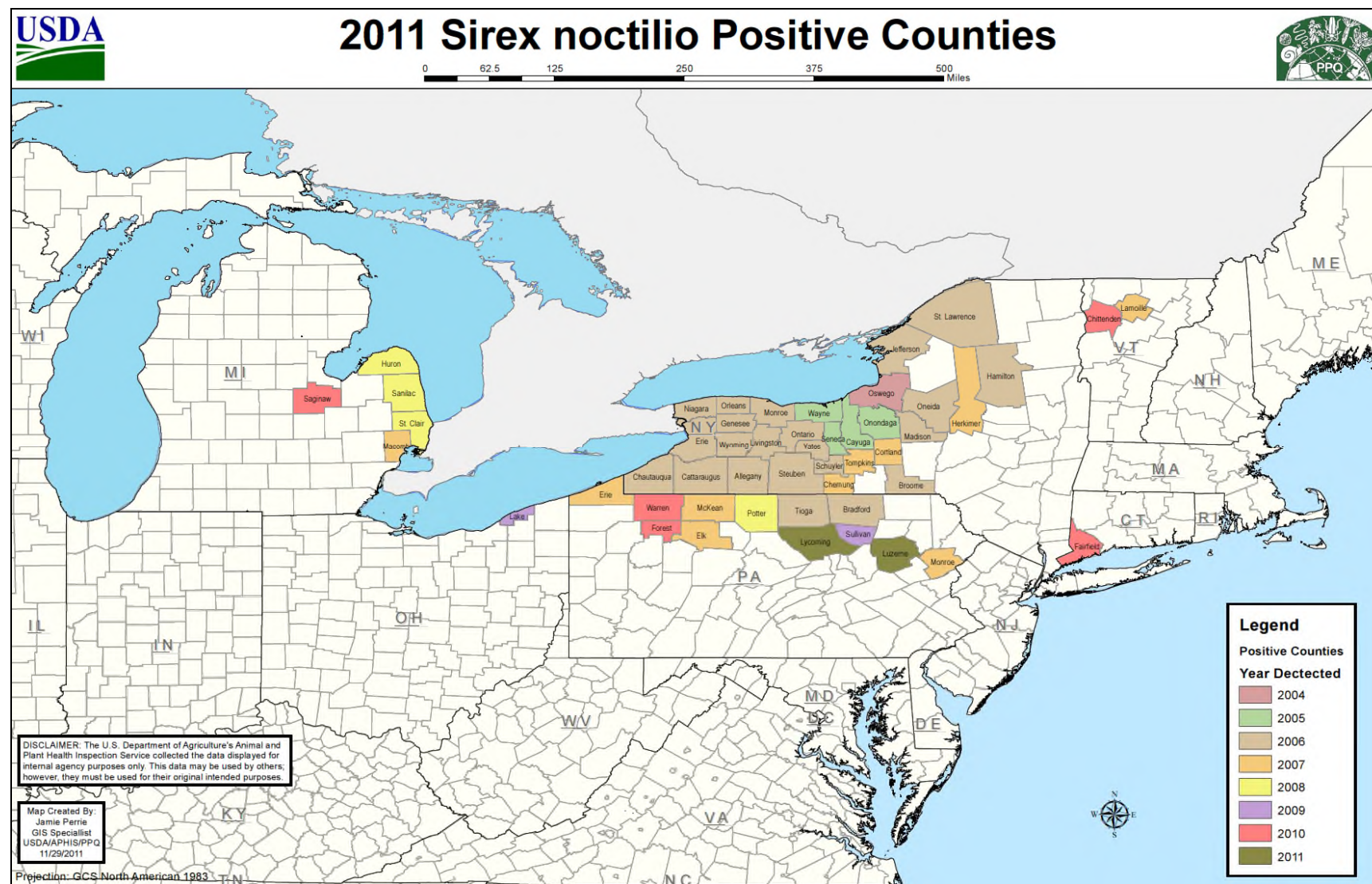
Source: USDA Forest Service, 2006

Note: The black circle indicates the approximate location of Suffolk County. Sirex Woodwasp susceptibility in Suffolk County ranges from little to very high.

Figure 5.4.8-10 shows the positive counties in New York State where Sirex Woodwasp has been detected. According to this figure, as of 2011, Sirex Woodwasp has not been detected in Suffolk County.



Figure 5.4.8-10. Sirex Woodwasp in New York State.



Source: New York State Invasive Species Clearinghouse, 2014 ([http://www.nyis.info/index.php?action=invasive\\_detail&id=47](http://www.nyis.info/index.php?action=invasive_detail&id=47))



### **Previous Occurrences and Losses**

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Many sources provided historical information regarding previous occurrences and losses associated with infestation events throughout New York State and Suffolk County. With so many sources reviewed for the purpose of this HMP, loss and impact information for many events could vary depending on the source. Therefore, the accuracy of monetary figures discussed is based only on the available information identified during research for this HMP.

Between 1954 and 2013, FEMA declared that New York State experienced one infestation-related emergency (EM) classified as a virus threat. Generally, these disasters cover a wide region of the State; therefore, they may have impacted many counties. However, not all counties were included in the disaster declarations. Suffolk County was included in this declaration (FEMA, 2013).

Based on all sources researched, known infestation events that have affected Suffolk County and its municipalities are identified in Table 5.4.8-3. With infestation documentation for New York State being so extensive, not all sources have been identified or researched. Therefore, Table 5.4.8-3 may not include all events that have occurred throughout the County and region.



Table 5.4.8-3. Infestation and Invasive Species Events in Suffolk County, 2008 to 2013

Dates of Event	Event Type	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
2008	Curly Pondweed	N/A	N/A	Detected in lakes fed through the Carlis River and at Town Hall Pond in the Village of Lindenhurst (Town of Babylon). Town introduced “sterile” grass carp in 2011 at the Town Hall pond to control plant growth. Similar plans for stocking grass carp at the town lake at Phelps Lane Pond are planned.	NYSDEC, Town of Babylon
2011	Lyme Disease	N/A	N/A	In 2011, Lyme Disease was the most commonly reported vector-borne illness in the U.S., according to CDC. As of October 2011, over 95,000 cases have been reported for New York State to the NYSDOH since Lyme Disease became reportable in 1986. Since 2003, New York has reported an average of over 4,200 cases per year. Suffolk County reported 12,871 cases of Lyme Disease between the years of 1992 to 2011.	CDC, NYSDOH
July 2013	ALB	N/A	N/A	ALB detected in East Farmingdale, Farmingdale Village, and Melville. Over 200 trees were removed under emergency quarantine measures.	APHIS
November 2013	Dengue Fever	N/A	N/A	A man from the Town of Babylon was hospitalized with dengue virus which was believed to be contracted locally. Overall, in 2013, dengue fever was tested positive in 10 people in Suffolk County (those acquired by traveling outside of the U.S.).	USGS

ALB Asian Longhorned Beetle  
CDC Center for Disease Control  
FEMA Federal Emergency Management Agency  
N/A Not Applicable  
NYSDOH New York State Department of Health





*West Nile Virus (WNV and other mosquito-borne diseases)*

WNV data ranging from 2000 to 2012 was provided by the NYSDOH, for all counties of New York State, including Suffolk County. For the purpose of this HMP update, data from 2008 to present was included in Table 5.4.8-4. The data is as follows:

**Table 5.4.8-4. WNV Positive Results for Suffolk County (2008 to 2012)**

Year	Humans		Equine	Mosquito	Other
	Positive Specimens	Deaths			
2008	9	0	1	41	0
2009	1	0	0	17	0
2010	25	1	0	295	0
2011	4	0	0	81	0
2012	14	0	1	210	0
<b>Total</b>	<b>53</b>	<b>1</b>	<b>2</b>	<b>644</b>	<b>0</b>

Source: NYSDOH, 2013

Notes: Data indicate the presence of the virus in specimens analyzed; they do not necessarily indicate ill or symptomatic specifics. Numbers in parentheses indicate deaths. “Other” positive result cases include those found in other types of mammals (i.e. bats, squirrels, chipmunks, rabbits).

*Asian Longhorned Beetle (ALB)*

ALBs have caused serious tree losses in both New York State and Chicago, IL, particularly in New York City. Since its initial discovery in New York State in 1996, tree destruction and removal has been the only method for controlling the spread of ALB infestation. According to Mark Buccowich of the USDA Forest Service on November 15, 2001, ALB infestations were responsible for the destruction of a combined 7,900 trees in the quarantined areas in New York State and Illinois between 1998 and 2001. As of 2005, the New York ALB Cooperative Eradication Program reports that New York State agricultural officials removed and destroyed more than 7,190 trees in and around New York City and Long Island. However, this number of tree losses differs amongst various sources. Table 5.4.8-5 provides USDA data on the various areas of New York State that have been under quarantine, the date ALB were first found in that quarantine area, and the total number of infested trees found and removed in that area and cumulatively in New York State as of March 2006 (USDA, 2006).

**Table 5.4.8-5. New York ALB Detection and Tree Removal Summary**

Quarantine Zone	Date of First Detection	Most Recent Detection	Total # of Trees to Date
Central Long Island	1996	2006	1,929
Islip	1999	2006	27
<b>Total</b>	<b>N/A</b>	<b>N/A</b>	<b>6,041</b>

Source: USDA, 2006

Note: It is assumed that these numbers have fluctuated since 2006.





### Probability of Future Events

Based on historical documentation, increased incidences of infestation throughout New York and the overall impact of changing climate trends, it is estimated that Suffolk County and all its jurisdictions will continue to experience infestation events that may induce secondary hazards and health threats to the County population if infestations are not prevented, controlled or eradicated effectively. The Planning Committee views this as a “frequent” hazard of concern (hazard event that occurs from once in 10 years to once in 100 years) (see Table 5.3-3).

### Infestation

#### *West Nile Virus (WNV)*

WNV, never seen on this continent until 1999, has infected more than 37,000 people in the U.S. and killed more than 1,500 (CDC, 2013). Based on available data, it is expected that many more incidences will occur in the future throughout the U.S., including New York State.

According to a Suffolk County Community Health Assessment for 2010-2013 (Suffolk County Government, 2013), the potential threat of mosquito-borne disease in Suffolk County is real and ongoing. When this assessment was prepared, SCDHS records showed that 12 public health threats were declared in Suffolk County during the following years: 1994, 1996, and 1999-2008. All 7 public health threats were declared because of detection of mosquito-borne human diseases or pathogens, including Eastern Equine Encephalitis virus (EEE), malaria, and WNV disease. During these years, the following actual human diseases and deaths from locally acquired mosquito-borne disease were documented in Suffolk County:

- malaria case in 1999 in two young children,
- WNV infections in 2000,
- 1 WNV meningitis case in 2001,
- 8 WNV meningitis/encephalitis cases in 2002, which included 2 human deaths,
- 10 WNV meningitis or encephalitis cases in 2003, including 2 human deaths,
- 9 WNV cases in 2005,
- 2 WNV cases in 2006, and
- 8 WNV cases in 2008, primarily in adults over 50 years of age.

All of the critical components necessary to sustain the threat of mosquito-borne disease in Suffolk County have been clearly documented and appear to be occurring more frequently (i.e., the simultaneous presence of pathogenic organisms, mosquito species (vectors) capable of transmitting disease, and a susceptible population). Therefore, based on all available information and available data regarding mosquito populations, it is anticipated that WNV infections will continue to be a threat to Suffolk County.

#### *Lyme Disease*

Disease-carrying ticks will continue to inhabit the northeast, including Suffolk County, creating an increase in Lyme Disease and other types of infections amongst the county population if not controlled or prevented. Ecological conditions favorable to Lyme disease, the steady increase in the number of cases, and the challenge of prevention predict that Lyme disease will be a continuing public health concern. Personal protection measures, including protective clothing, repellents or acaricides, tick checks, and landscape modifications in or near residential areas, may be helpful. However, these measures are difficult to perform regularly throughout the summer. Attempts to control the infection on a larger scale



by the eradication of deer or widespread use of acaricides, which may be effective, have had limited public acceptance. New methods of tick control, including host-targeted acaricides against rodents and deer, are being developed and may provide help in the future (Steere, Coburn, and Glickstein, 2004).

Currently and in the future, control of Lyme disease will depend primarily on public and physician education about personal protection measures, signs and symptoms of the disease, and appropriate antibiotic therapy. Based on available information and the ongoing trends of disease-carrying tick populations, it is anticipated that Lyme disease infections will continue to be a threat to Suffolk County.

## **Invasive Species**

### *Asian Longhorned Beetle (ALB)*

The spread of ALB to other tree populations should be preventable if USDA quarantine restrictions are followed with the ongoing monitoring of area trees for rapid detection of beetle infestations. According to the USDA APHIS, surveys, regulatory measures and control that the ALB problem can and should be eradicated. However, the USDA also indicates that if this beetle continues to spread, potential damage is significant throughout the U.S., including New York State.

### *Sirex Woodwasp*

The USDA Forest Service ranks Suffolk County as having a medium to very high introduction potential, establishment potential, and susceptibility potential for Sirex Woodwasp infestations (USDA Forest Service, 2006).

## **Climate Change**

According to the 2014 New York State HMP update, rising summer temperatures, along with little change in summer rainfall, are projected to increase the frequency of short-term droughts. This scenario will lead to impacts on the natural and managed ecosystems across New York State. Water management and hydrology are also affected (NYS DHSES 2013).

Climate change is beginning to affect both people and resources in New York State, and these impacts are projected to continue growing. Impacts related to increasing temperatures and sea level rise are already being felt in the State. ClimAID: the Integrated Assessment for Effective Climate Change in New York State (ClimAID) was undertaken to provide decision-makers with information on the State's vulnerability to climate change and to facilitate the development of adaptation strategies informed by both local experience and scientific knowledge (New York State Energy Research and Development Authority [NYSERDA], 2011).

Each region in New York State, as defined by ClimAID, has attributes that will be affected by climate change. Suffolk County is part of Region 4, New York City and Long Island. Some of the issues in this region, affected by climate change, include: the area contains the highest population density in the State; sea level rise and storm surge increase coastal flooding, erosion, and wetland loss; challenges for water supply and wastewater treatment; increase in heat-related deaths; illnesses related to air quality increase; and higher summer energy demand stresses the energy system (NYSERDA, 2011).

Temperatures and precipitation amounts are expected to increase throughout the State, as well as in Region 4. It is anticipated that by the 2020s, the State's temperature will rise between 1.5 and 3°F; 3 to



5.5°F by the 2050s; and 4 to 9°F by the 2080s. The lower ends of these ranges are for lower greenhouse gas emissions scenarios and the higher ends for higher emission scenarios (NYSERDA, 2011).

In Region 4, it is estimated that temperatures will increase by 3°F to 5°F by the 2050s and 4°F to 7.5°F by the 2080s (baseline of 53°F). Precipitation totals will increase between 0 and 10% by the 2050s and 5 to 10% by the 2080s (baseline of 43 inches). Table 5.4.8-6 displays the projected seasonal precipitation change for the New York City and Long Island ClimAID Region (NYSERDA, 2011).

**Table 5.4.8-6. Projected Seasonal Precipitation Change in Region 4, 2050s (% change)**

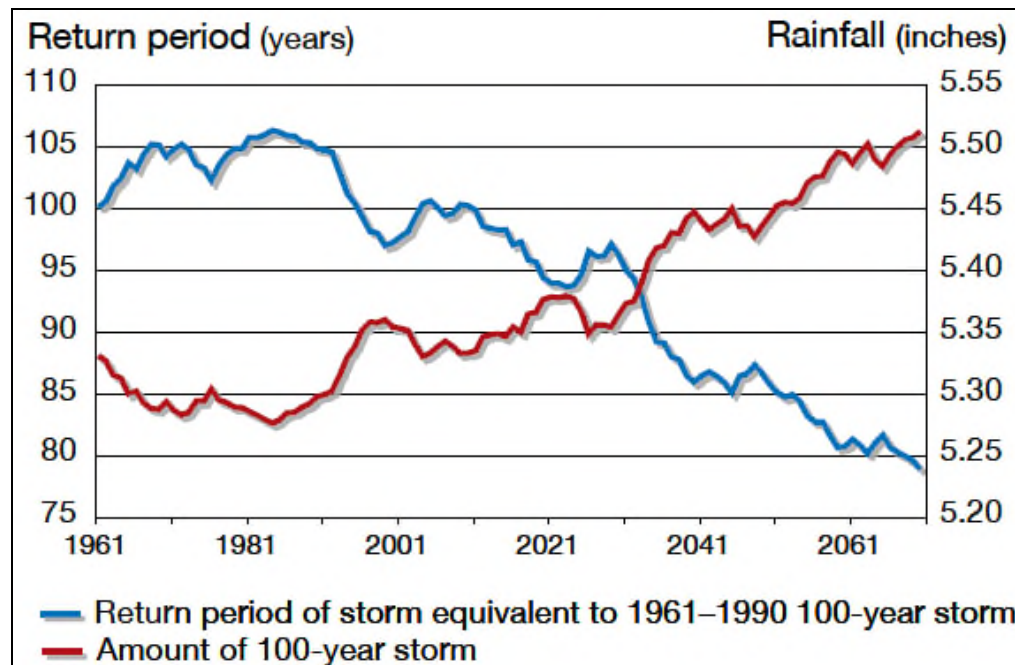
Winter	Spring	Summer	Fall
0 to +15	0 to +10	-5 to +10	-5 to +10

Source: NYSEDA, 2011

Annual temperatures in New York State have been rising throughout the State since the start of the 20<sup>th</sup> century. State-average temperatures have increased by approximately 0.6°F since 1970, with winter warming exceeding 1.1°F per decade. Extreme heat events are likely to increase throughout New York State and short-duration warm season droughts will become more common.

Figure 5.4.8-11 displays the project rainfall and frequency of extreme storms in New York State. The amount of rain fall in a 100-year event is projected to increase, while the number of years between such storms (return period) is projected to decrease. Rainstorms will become more severe and more frequent (NYSERDA, 2011).

**Figure 5.4.8-11. Projected Rainfall and Frequency of Extreme Storms**



Source: NYSEDA, 2011

Total precipitation amounts have slightly increased in the Northeast U.S., by approximately 3.3 inches over the last 100 years. There has also been an increase in the number of two-inch rainfall events over a 48-hour period since the 1950s (a 67-percent increase). The number and intensity of extreme precipitation events are increasing in New York State as well. More rain heightens the danger of



localized flash flooding, streambank erosion and storm damage (Cornell University College of Agriculture and Life Sciences, 2011).

With the projection of temperature and rainfall increase due to climate change, there is evidence that climate change may be a factor in the expansion of infectious diseases in the U.S. Mosquitos capable of carrying and transmitting diseases now live in at least 28 states. As temperatures increase and rainfall patterns change, these insects can remain active for longer seasons and in wider areas. Lyme disease could expand throughout the U.S. and northward into Canada, as temperatures warm, allowing ticks to move into new regions. Warmer temperatures, heavy rainfall and high humidity have reportedly increased the rate of human infection of WNV (Natural Resources Defense Council 2013).



## **Vulnerability Assessment**

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To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For infestation, Suffolk County has been identified as the hazard area. Therefore, all assets in Suffolk County, as described in the County Profile section, are vulnerable to infestation. The following text evaluates and estimates the potential impact of infestation on Suffolk County including:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impact on: (1) life, health and safety of residents, (2) general building stock, (3) critical facilities, (4) economy, and (5) future growth and development
- Effect of climate change on vulnerability
- Change of vulnerability as compared to that presented in the 2008 Suffolk County Hazard Mitigation Plan
- Further data collections that will assist understanding this hazard over time

### **Overview of Vulnerability**

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Infestation and invasive species are a significant concern to Suffolk County, mainly due to its impact on public health and natural resources. Estimated losses are difficult to quantify; however infestation can impact Suffolk County's population and economy. According to the Long Island Chapter of The Nature Conservancy, infestation also has major impacts on the terrestrial ecosystems of Suffolk County and threatens ecological diversity on Long Island. Additionally, direct impacts of infestation have cascading indirect impacts. As vegetation dies or becomes stressed/weakened by pests such as the ALB, there is an increase in available fuel and increase in high intensity wildfires. As species composition changes due to infestation outbreaks, whole fire regimes can shift. Physical stresses on trees may also affect how street trees respond to physical stresses caused by other natural hazards such as hurricanes, drought and ice storms (Kurtz, 2007).

### **Data and Methodology**

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Due to a lack of quantifiable loss information, a qualitative assessment was conducted to evaluate the assets exposed to this hazard and the potential impacts associated with this hazard.

### **Impact on Life, Health and Safety**

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The entire population of Suffolk County is vulnerable to infestation. According to the 2010 U.S. Census, Suffolk County had a population of 1,493,350. The elderly population and people with suppressed immune systems are most susceptible to the effects of WNV. According to the 2010 U.S. Census, Suffolk County's population of 65 and over was 201,793.

### **Impact on General Building Stock and Critical Facilities**

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No structures are anticipated to be directly affected by infestation or invasive species. However, based on input from the Planning Committee, invasive species do have the potential to impact building stock, such as individual septic systems. Other impacts include invasive species remediation of stream beds and marshes.

### **Impact on Economy**

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The impact infestation and invasive species have on the economy and estimated dollar losses are difficult to measure and quantify. Costs associated with the activities and programs implemented to conduct surveillance and address infestation have not been quantified in available documentation. Instead,





activities and programs implemented by the County to address this hazard are described below, all of which could impact the local economy.

#### **West Nile Virus**

The Suffolk County Department of Public Works (DPW), Division of Vector Control, is responsible for controlling mosquito infestations. To control mosquito infestation, Vector Control employs an integrated control program that concentrates on stopping mosquitoes at the larval stage. This includes water management (i.e., draining standing water in ditches and marshes without harming the vegetation and environment), biological control (i.e., utilizing fish and other predators to eat mosquito larvae), and utilizing bacterial pesticides and insect growth regulators to kill larvae and adult mosquitoes (Suffolk County Government, Date Unknown).

The Suffolk County Department of Health Services (SCDHS) Arthropod-borne Diseases Surveillance program's mission is to prevent the spread of arthropod-borne diseases (viral encephalitis, malaria, and tick-borne diseases including, Rocky Mountain Spotted Fever, Babesiosis, Ehrlichiosis, Lyme disease and Tularemia). Surveillance is conducted to determine the presence of various species and prevalence of these pathogens in the County's arthropod population and investigate health threats of arthropod-borne diseases to County residents. The SCDHS also maintains a website educating residents on WNV and other mosquito-borne diseases.

#### **Lyme Disease**

The SCDHS and Suffolk County Parks continuously prepare education materials and align with community partners to educate the public on Lyme Disease. As part of this commitment to public awareness, the month of May has been designated by Suffolk County as Lyme Disease Awareness Month. The SCDHS, Bureau of Preventative Services conducts arthropod-borne diseases surveillance to determine the presence of various species and prevalence of these pathogens in our arthropod population and investigate health threats of arthropod-borne diseases to Suffolk County residents (Suffolk County Government, Date Unknown).

#### **Asian Longhorned Beetle**

Steps taken to address and eradicate ALB may be costly to local governments and impact the economy. As stated earlier, these steps include: (1) quarantine infested areas; (2) cut, chip and burn infested trees; (3) apply of insecticide treatments to decrease beetle populations and prevent future tree loss; and (4) survey impacted areas. Additional costly actions to address ALB include the replanting of trees to make up for the trees removed or destroyed. Lastly, the clean-up and removal of tree debris as a result of severe weather may be prolonged and more costly due to the need to adhere to quarantine areas.

#### **Impact of Future Growth and Development**

As discussed in Section 4, areas targeted for future growth and development have been identified across the County. Any areas of growth could be potentially impacted by the infestation hazard because the entire planning area is exposed and vulnerable.

#### **Change of Vulnerability**

Overall, the County's vulnerability has not changed since the 2008 original HMP and the entire County will continue to be exposed and vulnerable to infestation and invasive species.



#### **Additional Data and Next Steps**

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For the Plan Update, any additional information regarding localized concerns and past impacts will be collected and analyzed. This data will be developed to support future revisions to the plan. Mitigation efforts could include building on existing New York State, Suffolk County, and local efforts.